Purpose:
The purpose of this work is to develop an approach to account for the attenuation of Varian Exact IGRT couch top for spine cancer patients in spine stereotatic radiosurgery.

Methods:
Varian Exact IGRT couch which has carbon fiber plates sandwiched with a plastic foam core was used for this study. Transmission of 6MV x-rays through the couch was measured at various oblique beam angles. Based on the measured values, we modeled the couch top as a stored organ in Pinnacle treatment planning system (TPS) for spine stereotatic radiosurgery (SSRS) patients. A planner can load the virtual couch top and override the density when designing a treatment plan to account for the couch attenuation explicitly. The dosimetric impact of the couch top on DVHs was investigated in 3 representative patients.

Results:
At normal incidence, percentage of the attenuation of the Exact IGRT couch for a 6MV beam was measured to be 2.40% and 2.68% for field size of and , respectively. The attenuation was found to be gantry angle dependent, with maximum attenuation 3.90% at 120° for field size of and 4.25% at 130° for , respectively. By using a fixed density of 1.05 within the thin carbon fiber layers, the calculated attenuation for the virtual couch top were 2.38% and 2.94% for field, 4.15%, and 4.57% for field, respectively, which agreed well with the measurement. Without considering the couch attenuation, the average loss of target coverage was 7.1% in three representative cases we analyzed.

Conclusions:
The attenuation of Varian Exact IGRT Couch Top should not be ignored when using the couch top for SSRS patients. A clinical approach was developed to account for the attenuation. A calibrated virtual couch model can be used to account for the attenuation in the treatment planning process.